

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2, 4-9, 11-14, and 19-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmermann et al. (US Pat. 6,602,472, hereinafter Zimmerman) in view of Tai et al. (US Pat. 5,994,696, hereinafter Tai).

Regarding claim 11 and 23, Fig. 4a of Zimmerman discloses an electrospray source wafer (50) having at least one flat and thin tip (47) (see col. 6, lines 28-31) in cantilever in relation to the rest of the structure, the tip (57) being provided with a capillary slot (56) (see col. 6, lines 28-31) formed through the complete thickness of the tip, the thickness being substantially orthogonal to the plane, the capillary slot ending up at the end of the tip (57) to form the ejection orifice of the electrospray source, the source comprising means of supplying (55) the capillary slot (56) with liquid to be nebulised and means of applying an electrospray voltage to the liquid (see col. 6, lines 28-37).

Zimmerman does not disclose a support with a main face on which the wafer (50) is formed integrally. However, Fig. 3 of Tai discloses an electrospray source wafer (320) being formed upon a support structure (330) (see col. 3, lines 44-67). It would have been obvious at the time of invention to a person of ordinary skill in the art to have a support structure on which the wafer of Zimmerman would be formed on to have greater ease of balancing and directing the direction the electrospray microchip would form.

Regarding claim 2, Fig. 4a of Zimmermann discloses the supply means comprises at least one reservoir (55) in fluidic communication with the capillary slot (56) (see col. 6, lines 28-37).

Regarding claims 4 and 13, Figs. 1 and 4a of Zimmermann discloses the supply means comprises a reservoir (55) constituted by a recess formed in the wafer (50) and in fluidic communication with the capillary slot (56) (see col. 6, lines 34-37).

Regarding claims 5 and 14, Fig. 4a of Zimmermann discloses at least one electrode (57) arranged so as to be in contact with the liquid to be nebulised (see col. 6, lines 28-37). It should be noted that in order for the liquid to be sprayed as disclosed above, a means of applying a voltage must inherently be present.

Regarding claim 6, Fig. 4a of Zimmermann discloses that the wafer is at least partially electrically conductive (see col. 6, lines 31-34).

Regarding claim 7, Fig. 4a of Zimmermann discloses that the tip (57) microsprays the liquid (see col. 6, lines 31-34), but in that embodiment, Zimmerman does not specifically teach the channel is an electrically conductive wire. However, Zimmerman teaches the passage can be metalized, which allows the substance to be

conveyed to be microsprayed electro-osmotically (see col. 6, lines 59-64). It should be noted that a channel made of metal can be viewed as a conductive wire in contact with the liquid drawing out the sample from the reservoir to be microsprayed through electrical means is applying a voltage to the metal channel. In view of such teaching, it would have been obvious to the ordinary skill in the art at the time the invention was made to modify the channel (56) in contact with a liquid to be metal to apply a voltage to microspray the sample for the purpose of precharging the sample so less power is required to be applied at the tip for spraying the sample.

Regarding claim 8, Fig. 4a of Zimmermann discloses the supply means comprises a capillary tube (56) (see col. 6, lines 28-31).

Regarding claim 9, Fig. 4a of Zimmermann discloses the supply means comprises a channel (51) formed in a microsystem supporting the structure and in fluidic communication with the capillary slot (56) (see col. 6, lines 18-31).

Regarding claim 12, Fig. 4a of Zimmermann discloses providing the substrate (50) to form the support, the delimitation of the support by means of trenches etched in the substrate, deposition, on a zone of the substrate corresponding to the future tip (57) of the structure, of sacrificial material according to a determined thickness, the deposition of the wafer on the support delimited in the substrate, the tip (57) of the wafer being situated on the sacrificial material, the elimination of the sacrificial material, and the detachment of the support in relation to the substrate by cleavage at the level of the trenches (see col. 6, lines 11-43).

Regarding claim 19, Fig. 4a of Zimmermann discloses electrospraying the liquid and analyzing the liquid by mass spectrometry (see col. 6, lines 31-34).

Regarding claim 20, Fig. 4a of Zimmermann discloses the claimed invention except for controlling the size of the liquid spray. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Zimmermann by varying the voltage source applied to the tip to vary the size of the formed droplets because by varying the voltage, the skilled artisan can vary the size of the liquid spray affects the characterization of the ions to be detected, and thus, detecting only the desired properties of the sample. Furthermore, it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art, and one of ordinary skill in the art would have manipulated the voltage to obtain the desired voltage and size of the spray to achieve the correct vaporization for detection. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claims 21, Zimmermann discloses the electrospray source of claim 1 except for using the source to carry out molecular writing. However, it would have been obvious at the time of invention to a person of ordinary skill in the art to modify by the invention of Zimmermann by using the source as taught in any device which utilizes electrospray as a source for molecular writing as art recognized equivalents of a supply of chemical compounds to be sprayed.

Regarding claims 22, Zimmermann discloses the electrospray source of claim 1 except for using the source to define an electrical junction potential of a device. However, it would have been obvious at the time of invention to a person of ordinary

skill in the art to modify by the invention of Zimmermann by using the source as taught in any device which utilizes electrospray as a source for defining an electrical junction potential of a device as art recognized equivalents of a supply of electrosprayed liquid.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmermann in view Tai and in further view of Schultz et al. (US Pat. 6,633,031, hereinafter Schultz).

Regarding claim 10, a difference between Zimmerman and the claimed invention is the wafer has a surface hydrophobic to the liquid to be nebulised. However, Schultz discloses the use of a hydrophobic coating on a microchip to improve stability in the process of electrospray (see col. 8, lines 26-43). In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of Zimmermann by having a hydrophobic coating on the wafer for the purpose of improving stability during the electrospray process as taught by Schultz.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hanway Chang whose telephone number is (571)270-5766. The examiner can normally be reached on Monday to Friday 7:30 AM till 4 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on (571)272-2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Hanway Chang
April 7, 2011
/H. C./
Examiner, Art Unit 2881

/ROBERT KIM/
Supervisory Patent Examiner, Art Unit 2881